CLAIMS

1. An interconnect for an electrically driven solid electrolyte oxygen separation device comprising a composition of matter represented by the general formula:

$$Ln_xCa_{x'}A_{x''}Mn_yB_{y'}O_{3-\delta}$$

wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

A is selected from the group consisting of Sr, Ba and Y;

B is selected from the group consisting of Cu, Co, Cr, Fe, Ni, Zn, Nb, Zr, V, Ta, Ti, Al, Mg, and Ga;

$0.1 \leq x \leq 0.9$; $0.1 \leq x' \leq 0.9$; $0 \leq x'' \leq 0.5$;

$0.5 < y < 1.2$; and $0 \leq y' \leq 0.5$;

provided that $x + x' + x'' = 1$ and $1.2 > y + y' > 1.0$

wherein δ is a number which renders the composition of matter charge neutral.

2. The interconnect of claim 1 wherein Ln is La.

3. The interconnect of claim 1 wherein A is Sr.

4. The interconnect of claim 1 wherein B is Co.

5. The interconnect of claim 1 wherein $0.3 \leq x \leq 0.7$ and $0.3 \leq x' \leq 0.7$.

6. The interconnect of claim 1 wherein x" is 0.

7. The interconnect of claim 1 wherein $0.9 < y < 1.2$ and $0 \leq y' \leq 0.1$.

8. The interconnect of claim 1 wherein y' is 0.

9. The interconnect of claim 1 wherein Ln is La, A is Sr, B is Co, $0.3 \leq x \leq 0.5$; $0.5 \leq x' \leq 0.7$; $0 \leq x'' \leq 0.2$; $0.9 < y < 1.05$; and $0 \leq y' \leq 0.1$; provided that $x + x' + x'' = 1$ and $1.05 > y + y' \geq 1.02$.

10. An interconnect for an electrically driven solid electrolyte oxygen separation device comprising a composition of matter represented by the general formula

$$Ln_xCa_{x'}Mn_yO_{3-\delta}$$

wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

$0.1 \leq x \leq 0.9$; $0.1 \leq x' \leq 0.9$; and

$1.0 < y < 1.2$;

provided that $x + x' = 1$, and

wherein δ is a number which renders the composition of matter charge neutral.

11. The interconnect of claim 10 wherein $0.3 \leq x \leq 0.7$.

12. The interconnect of claim 10 wherein Ln is La, $0.3 \leq x \leq 0.5$ and $1.0 < y < 1.05$.

13. An electrochemical solid-state device comprising at least two electrochemical cells which are electrically connected in series by one or more interconnects wherein at least one interconnect comprises a composition of matter represented by the formula

$$Ln_xCa_{x'}A_{x''}Mn_yB_{y'}O_{3-\delta}$$

wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

A is selected from the group consisting of Sr, Ba and Y;

B is selected from the group consisting of Cu, Co, Cr, Fe, Ni, Zn, Nb, Zr, V, Ta, Ti, Al, Mg, and Ga;

$0.1 \leq x \leq 0.9$; $0.1 \leq x' \leq 0.9$; $0 \leq x'' \leq 0.5$;

$0.5 < y < 1.2$; and $0 \leq y' \leq 0.5$;

provided that $x + x' + x'' = 1$ and $1.2 > y + y' > 1.0$; and
wherein δ is a number which renders the composition of matter charge neutral.

14. The electrochemical solid-state device of claim 13 wherein Ln is La, A is Sr, B is Co, $0.3 \leq x \leq 0.5$; $0.5 \leq x' \leq 0.7$; $0 \leq x'' \leq 0.2$; $0.9 < y < 1.05$; and $0 \leq y' \leq 0.1$; provided that $x + x' + x'' = 1$ and $1.05 > y + y' \geq 1.02$.

15. An electrochemical solid-state device comprising at least two electrochemical cells which are electrically connected in series by one or more interconnects wherein at least one interconnect comprises a composition of matter represented by the formula:

$$Ln_xCa_{x'}Mn_yO_{3-\delta}$$

wherein
Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;
$0.1 \leq x \leq 0.9$; $0.1 \leq x' \leq 0.9$;
$1.0 < y < 1.2$
provided that $x + x' = 1$; and
wherein δ is a number which renders the composition of matter charge neutral.

16. The electrochemical solid-state device of Claim 15 wherein Ln is La, $0.3 \leq x \leq 0.5$ and $1.0 < y < 1.05$.